

1603.1001

UNITED STATES PATENT AND TRADEMARK OFFICE

Re: Application of: Francis M. SNODGRASS
Serial No.: Not yet known
Filed: Herewith
For: MATRIX ASSEMBLY

LETTER RE PRIORITY

Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450

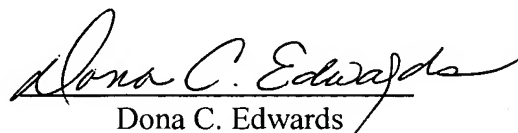
April 5, 2005

Dear Sir:

Applicant hereby claims the priority of Gt. Britain Patent Application No. 0223147.0 filed October 5, 2002 through International Patent Application No. PCT/GB2003/003835 filed September 4, 2003.

Respectfully submitted,

By:



Dona C. Edwards
Reg. No. 42,507

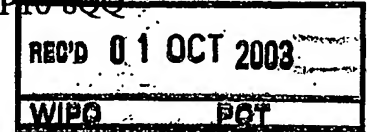
Steinberg & Raskin, P.C.
1140 Avenue of the Americas, 15th Floor
New York, NY 10036-5803
Telephone: (212) 768-3800
Facsimile: (212) 382-2124
E-mail: sr@steinberggraskin.com



GB/03/3835 #2

INVESTOR IN PEOPLE

The Patent Office
Concept House
Cardiff Road
Newport
South Wales
NP10 8QQ



I, the undersigned, being an officer duly authorised in accordance with Section 74(1) and (4) of the Deregulation & Contracting Out Act 1994, to sign and issue certificates on behalf of the Comptroller-General, hereby certify that annexed hereto is a true copy of the documents as originally filed in connection with the patent application identified therein.

In accordance with the Patents (Companies Re-registration) Rules 1982, if a company named in this certificate and any accompanying documents has re-registered under the Companies Act 1980 with the same name as that with which it was registered immediately before re-registration save for the substitution as, or inclusion as, the last part of the name of the words "public limited company" or their equivalents in Welsh, references to the name of the company in this certificate and any accompanying documents shall be treated as references to the name with which it is so re-registered.

In accordance with the rules, the words "public limited company" may be replaced by p.l.c., plc, P.L.C. or PLC.

Re-registration under the Companies Act does not constitute a new legal entity but merely subjects the company to certain additional company law rules.

Signed

Stephen Hordley

Dated 23 September 2003

**PRIORITY
DOCUMENT**
SUBMITTED OR TRANSMITTED IN
COMPLIANCE WITH RULE 17.1(a) OR (b)

The

Patent
Office

THE PATENT OFFICE

A

5 OCT 2002

Request for grant of a patent

(see the notes on the back of this form. You may also get an explanatory leaflet from the Patent Office to help you fill in this form)

1/77
07 OCT 02 E753613-2, 002835
P01/7700/0.00-0223147.0

The Patent Office

Cardiff Road
Newport
South Wales NP10 8QQ

1. Your reference

PRW/P201235

2. Patent application number
(The Patent Office will fill in this part)

0223147.0

05 OCT 2002

3. Full name, address and postcode of the applicant (underline all surnames)

Man Mat Limited
Matrix House, Balthane Industrial Park
Ballasalla, Isle of Man
IM9 2AJ

Patents ADP number (if you know it)

8478752001

If the applicant is a corporate body, give the country/state of its incorporation

GB

4. Title of the invention

MATRIX ASSEMBLY

5. Name of your agent (if you have one)

URQUHART-DYKES & LORD

"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)

Tower House
Merrion Way
Leeds LS2 8PA
United Kingdom

Patents ADP number (if you know it)

1644004 ✓

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and (if you know it) the or each application number

Country	Priority application number (if you know it)	Date of filing (day/month/year)
---------	---	------------------------------------

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application	Date of filing (day/month/year)
-------------------------------	------------------------------------

8. Is a statement of Inventorship and of right to grant of a patent required in support of this request? (Answer 'Yes' if:
a) any applicant named in part 3 is not an inventor, or
b) there is an inventor who is not named as an applicant, or
c) any named applicant is a corporate body.
See note (d))

Yes

Patents Form 1/77

9. Enter the number of sheets for any of the following items you are filing with this form. Do not count copies of the same document

Continuation sheets of this form

Description	4
Claim(s)	-
Abstract	-
Drawing(s)	2 + 2

10. If you are also filing any of the following, state how many against each item.

Priority documents	-
Translations of priority documents	-
Statement of Inventorship and right to grant of a patent (Patents Form 7/77)	-
Request for preliminary examination and search (Patents Form 9/77)	-
Request for substantive examination (Patents Form 10/77)	-
Any other documents (Please specify)	-

11. I/We request the grant of a patent on the basis of this application.

Signature

URQUHART DYKES & LORD

Date

04/10/02

12. Name and daytime telephone number of person to contact in the United Kingdom

P R WHARTON - 0113 245 2388

Warning

After an application for a patent has been filed, the Comptroller of the Patent Office will consider whether publication or communication of the invention should be prohibited or restricted under Section 22 of the Patents Act 1977. You will be informed if it is necessary to prohibit or restrict your invention in this way. Furthermore, if you live in the United Kingdom, Section 23 of the Patents Act 1977 stops you from applying for a patent abroad without first getting written permission from the Patent Office unless an application has been filed at least 6 weeks beforehand in the United Kingdom for a patent for the same invention and either no direction prohibiting publication or communication has been given, or any such direction has been revoked.

Notes

- If you need help to fill in this form or you have any questions, please contact the Patent Office on 0645 500505.
- Write your answers in capital letters using black ink or you may type them.
- If there is not enough space for all the relevant details on any part of this form, please continue on a separate sheet of paper and write "see continuation sheet" in the relevant part(s). Any continuation sheet should be attached to this form.
- If you have answered 'Yes' Patents Form 7/77 will need to be filed.
- Once you have filled in the form you must remember to sign and date it.
- For details of the fee and ways to pay please contact the Patent Office.

MATRIX ASSEMBLY

This invention relates to the scoring or creasing of card-like material and, more particularly, relates to a method of manufacturing a matrix assembly for use in forming creases or score lines in card-like material, and to the matrix so formed.

Card-like material is creased to facilitate it being folded into its final shape by pressing the material between a creasing rule of a cutting and creasing press, and a creasing matrix. The creasing matrix comprises a long flexible strip having a channel formed longitudinally therein which is slightly wider than the creasing rule. The matrix strip is fastened to a press platen so that its channel is aligned with the creasing edge so that on closing the press the rule edge urges the portion of the card comprising the crease into the matrix channel to provide a well defined crease. In our European patent publication number 0107490 there is disclosed a form of matrix assembly which is widely used in cutting and creasing presses. The matrix generally comprises a steel strip onto which has been extruded one or more strips of plastic material to define a channel running longitudinally of the strip, the plastic material being adhered to the strip by means of perforations formed therein to which the plastic material can "key".

Typically, the steel strips used in the above form of matrix are of one of two thicknesses, 0.004" and 0.006". These thicknesses are required in order to give adequate strength owing to the presence of perforations. This thickness of steel strip required a reduction in the height of creasing rules used in cutting and creasing dies. Clearly it would be advantageous if a matrix could be formed of adequate strength which is sufficiently thin so as not to require modification of the height of the creasing rules of the cutting and creasing press.

The invention seeks to provide a method of forming a matrix, and a matrix so formed improved in the above respects.

According to a first aspect of the present invention, there is provided a method of forming a matrix assembly which comprises providing a steel strip, treating the upper surface of the steel strip with a resin adhesive, extruding one or more plastic material strips onto the metal strip to

define a longitudinal channel and heating the assembly so formed to cure the resin adhesive and adhere the plastic material to the metal strip.

The invention further comprises a matrix strip assembly made in accordance with the above method.

The method of the invention obviates the need to perforate the metal strip and this leads to a number of advantages. Firstly, omitting the perforation step enables the matrix assembly to be produced more cheaply. Secondly, with there being no perforations present, it is possible to use a thinner steel strip (for example, of thickness 0.002") and still retain adequate strength. This means that no modification need be made to the height of the creasing dies in a cutting and creasing press.

The surface of the previous matrix strip was rough owing to the presence of the perforations beneath the plastic, whereas the surface of the strip in accordance with the present invention is smooth, and there is therefore no embossing of board or card creased therewith. Furthermore, delamination, which could be caused with the previous matrix assembly when the strip was cut or mitred at the point of a perforation, now no longer occurs.

The absence of perforations also gives a longer running life and the plastic profile of the matrix assembly of the invention has an improved finish. Finally, waste is greatly reduced.

Preferably, the adhesive resin employed is a polyurethane or polyolefin resin. This is preferably applied to the surface of the steel strip in a continuous manner immediately before the latter passes into an extrusion die where the plastics material is attached thereto by extruding the plastic material profile onto the resin treated steel strip downstream of the extrusion die in a process called external crosshead extrusion. The advantage of this method is that the steel strip is not under significant pressure from plastic material in the crosshead die, allowing the use of thinner (e.g. 0.002") steel without deformation, and because of the fact that the strip freely passes through the crosshead die, the tooling life is increased greatly. The plastic extrusions may be controlled and guided into position externally of the crosshead die by a series of horizontally and vertically micrometer adjustable heated precision rollers ensuring complete

accuracy of size for both sides of the matrix, in respect of height, width and profile. Thereafter, the assembly passes to a heating zone to cure the adhesive resin and effect bonding of the matrix. Following this, the assembly is cooled, pulled off and further assembled in-line with a double-sided pressure sensitive adhesive tape to the bottom of the matrix, after which it is cut into suitable lengths for packaging and onward transmission.

The plastic material adhered to the steel strip may be any suitable plastics material, but is preferably polypropylene. The metallic material may also be any suitable metal, but is preferably steel. The strip may be conditioned and degreased before use, for example, using a propane torch or the like.

The invention will be described further, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a schematic diagram illustrating the method of the invention;

Figure 2 is a plan view of the die and adaptor on an enlarged scale;

Figure 3 is a cross-section of the die and adaptor; and

Figure 4 is a front elevation of the die.

Referring to the drawings, and in particular Figure 1, a steel strip 10, which may have been pre-conditioned, is pulled between a haul off mechanism 12 and a brake mechanism 14. Between the latter devices it is treated in accordance with the invention as follows.

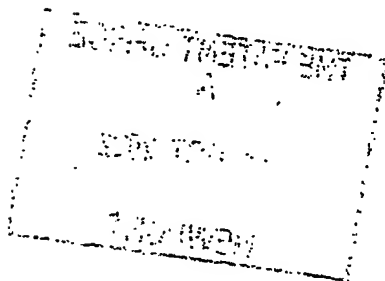
Firstly, the strip 10 enters a slot coat station 16 where polyurethane or a polyolefin hotmelt resin is applied to its upper surface. The strip 10 then passes into the die 18 portion of an extruder 20 where a polypropylene plastics material 22 is extruded onto the steel strip 10 to form two parallel longitudinal strips 24, 26 defining between them a channel 28. The plastic extrusions may be controlled and guided into position externally of the crosshead die by a series of horizontally and vertically micrometer adjustable heated precision rollers in a roller station

29 ensuring complete accuracy of size for both sides of the matrix, in respect of height, width and profile

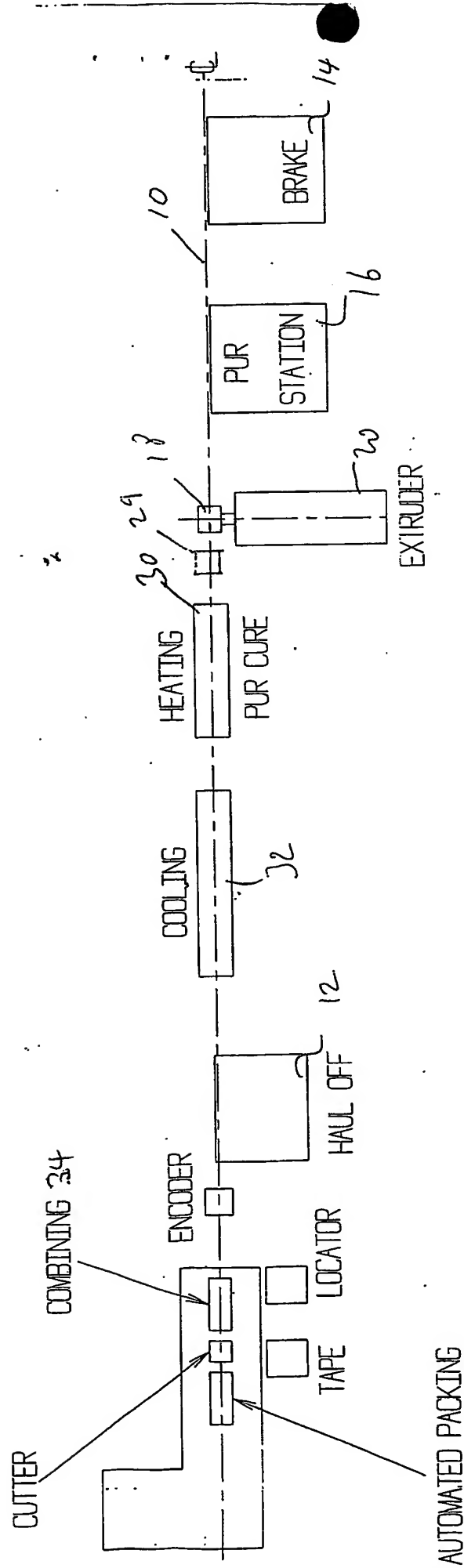
The assembly then passes into a heating unit 30 where the polyurethane is cured, bonding the strips 24,26 to the metal strip 10 and forming the matrix assembly. The plastic material is preferably provided with a blowing agent, the latter helps stabilise the modified polypropylene preferably employed, eliminating shrinkage of the plastics material profile. The temperature of the extrusion and polyurethane cure zone 30 is preferably high, in the region of 250°C, to effect curing.

The assembly then passes into a cooling zone 32, preferably comprising a vortex for rapid cooling. Further cooling may be provided, after which the assembly advances to the haul off winder unit 12. The matrix is combined with a double-sided adhesive tape in a combining zone 34 where the tape is applied to the underside of the matrix strip 10. Thereafter, the matrix assembly may be encoded, cut into predetermined lengths and packaged as is known *per se*.

The absence of perforations in the metal strip 10 enables a thinner strip to be used than was heretofore possible and the finished matrix assembly is therefore thinner, whilst still having adequate strength. It can therefore be used in standard cutting and creasing presses without having to modify the cutter height.



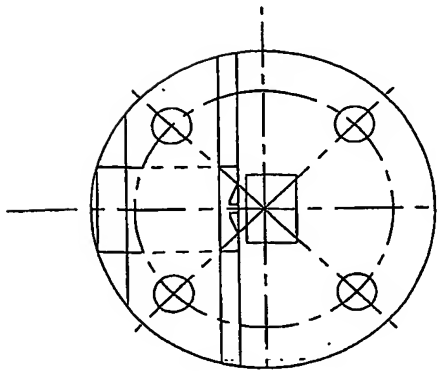
PRIMA-SCORE LINE SCHEMATICS



PUR = POLY URETHANE RESIN

Fig. 1

Y
L
X



FRONT ELEVATION OF DIE

FIG. 4

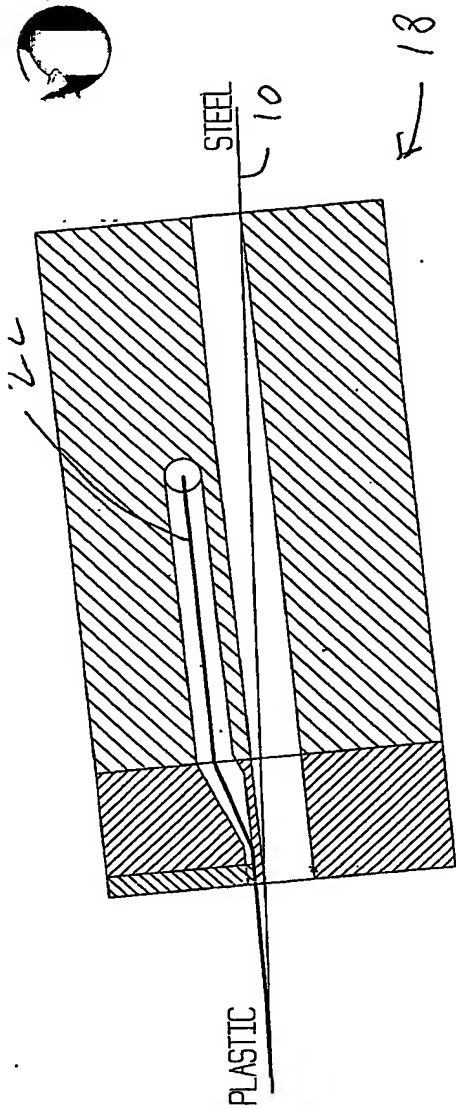


FIG. 3
CROSS-SECTION OF DIE AND ADAPTOR

18

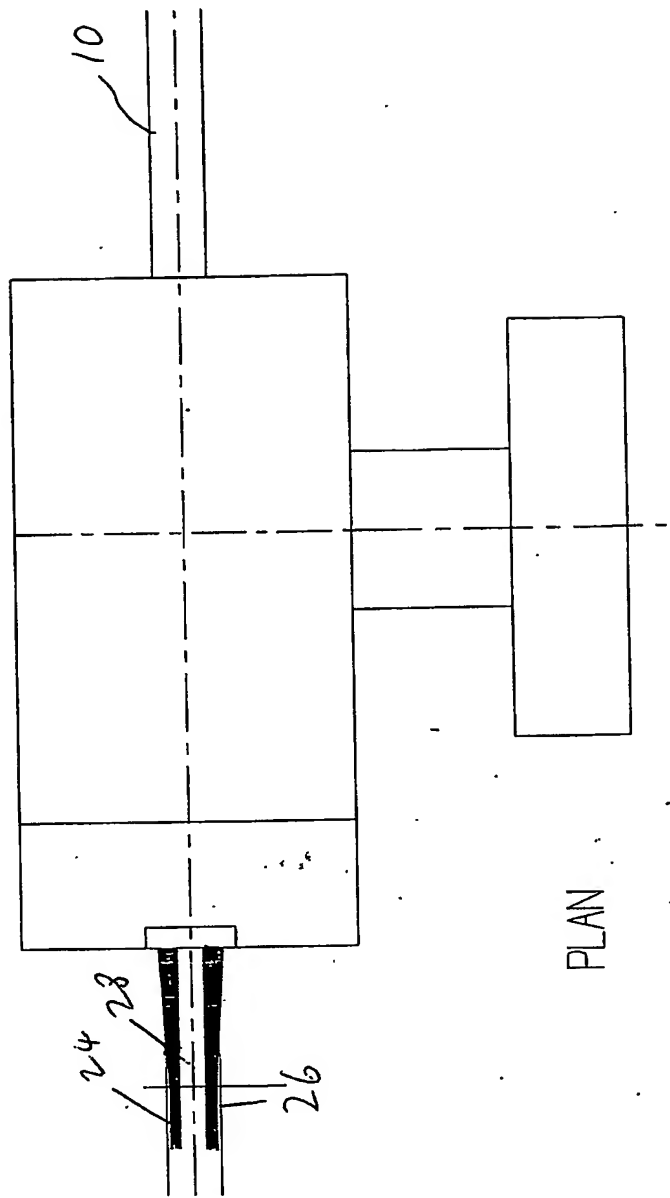


FIG. 2

Y
L
X

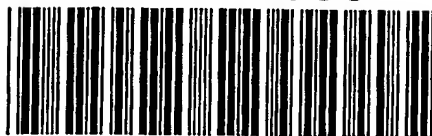
THE PATENT OFFICE

24 SEP 2003

Received in Patents
International Unit

PCT Application

GB0303835



**This Page is Inserted by IFW Indexing and Scanning
Operations and is not part of the Official Record**

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☐ BLACK BORDERS
- ☐ IMAGE CUT OFF AT TOP, BOTTOM OR SIDES
- ☐ FADED TEXT OR DRAWING
- ☐ BLURRED OR ILLEGIBLE TEXT OR DRAWING
- ☐ SKEWED/SLANTED IMAGES
- ☐ COLOR OR BLACK AND WHITE PHOTOGRAPHS
- ☐ GRAY SCALE DOCUMENTS
- ☒ LINES OR MARKS ON ORIGINAL DOCUMENT
- ☐ REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY
- ☐ OTHER: _____

IMAGES ARE BEST AVAILABLE COPY.

As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.